

## Review of the Ants of *Scabriceps* Group of the Genus *Monomorium* Mayr (Hymenoptera, Formicidae)

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**Abstract.** *Monomorium perplexum* sp. n. from Transcaucasus and Islands of Aegean Sea is described. *M. dentigerum* (Roger) and *M. evansi* Donisthorpe are redescribed; females and males of *M. criniceps* Mayr. are described first. *M. perplexum* differs from species of *scabriceps* group (except *M. muticum* Emery from Burma) by the absence of the long acute denticles on the anterior clypeal margin; it differs from *M. muticum* by smooth dorsum and sides of promesonotum. *M. dentigerum* and *M. evansi* are excluded from *scabriceps* group and are united to the *dentigerum* group. Key of species of the two groups is compiled.

**Key words:** Hymenoptera, Formicidae, *Monomorium*, taxonomy.

### INTRODUCTION

Genus *Holcomymex* was first described by Mayr (1879). Later Emery considered it as species group (Emery, 1908) and as subgenus of the genus *Monomorium* (Emery, 1921). Ettershank (1966) synonymised *Holcomymex* with *Monomorium*, and reduced all subgenera in this genus. Bolton (1987) proposed a new system of *Monomorium* and defined in it 8 species groups for Afrotropical region. *Scabriceps* group (sensu Bolton, 1987) included part of the former subgenus *Holcomymex* sensu Emery,

1921, and genus *Trichomyrmex* Mayr, 1865, described from only one female from Ceylon.

*M. scabriceps* group includes 8 species. Six of them are distributed in South and South-East Asia (India, Burma, Sri Lanka), one – in Afrotropical region throughout Sahelian zone (Bolton, 1987). One species described below as new from Transcaucasus, Turkey and isles of Aegean.

All these species are distinctive polymorphic and are some of the largest species of genus *Monomorium*. They are strictly or almost strictly granivorous (Bingham, 1903; Bolton, 1987; personal observations) and built nests in a ground.

### MATERIAL AND METHODS

This paper is based on the investigation of the material from Museum and Institute of Zoology

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Polish Academy of Sciences, Warsaw (MZPW), and collections of the Institute of Zoology Ukrainian Academy of Sciences, Kiev (includes Karawajew's collection) (IZK), Zoological Museums of Moscow University (ZMMU) and Zoological Institute of Russian Academy of Sciences, St.-Petersburg (ZIN).

Measurements and indices:

HL – length of head in full-face view, measured in a straight line from the anterior point of the median clypeal margin (includes denticles) to mid-point of the occipital margin;

HW – maximum width of the head in full-face view;

SL – maximum straight-line length of the antennal scape in profile;

OL – maximum diameter of eyes;

OW – minimum diameter of eyes;

AL – the diagonal length of the alitrunk in lateral view from the posterior base of the metapleural lobes to the antero-dorsal border of the promesonotum (in females and males) or to the anterior border of the neck shield (in workers);

AH – height of alitrunk in profile from dorsum to lower base of mesopleuron;

ScW – maximum width of scutum from above;

ScL – length of scutum from above;

SctL – length of scutellum from above;

CI (cephalic index) = HL:HW.

SI (scape index) = HL:SL.

OI (ocular index) = HL:OL;

ScI (scutum indexes): ScI 1 = (ScL+SctL):ScW;  
ScI 2 = ScL:ScW;

AI (alitrunk index) = AL:AH.

## RESULTS

Bolton (1987) included to the *scabriceps* group 8 species: *M. scabriceps* (Mayr, 1879), *M. criniceps* (Mayr, 1879), *M. glabrum* (André, 1883), *M. muticum* (Emery, 1887), *M. rogeri* (Mayr, 1865), and probably *M. wroughtonianum* Ettershank, 1966, are distributed in Oriental Region; *M. dentigerum* (Roger, 1862) from Middle East, and *M. abyssinicum* (Forel, 1892) from Afrotropical region. I agree with Bolton's opinion (1987) on excluding *M. evansi* Donisthorpe, 1918 from this species group. *M. whitei* Wheeler, 1915 was transferred to the genus *Chelaner* by Ettershank (1966), and later was included by Bolton (1987) in the Australian forcipatum group of the genus *Monomorium*.

Table 1.

Diagnosis of scabriceps and dentigerum groups of genus *Monomorium*

### *scabriceps* group:

workers:

- strongly polymorphic
- petiolar node low, triangular in profile and narrowly rounded on the top; postpetiole globular
- antennae with an indistinct 4-jointed club
- median portion of clypeus short, not projecting forwards anteromedially
- eyes slightly elongate or subcircular, OL:OW not more than 1.35
- propodeal spiracles an elongate ellipse or short slit
- propodeum angular in profile, frequently with blunt rounded denticles, sculptured dorsally;

males:

- antennal scape very short, shorter than second funicular joint
- body size small (HL < 1.0, AL < 2.5 mm), much smaller than conspecific females

### *dentigerum* group:

workers:

- monomorphic
- petiolar node high, massive, in profile subrectangular, broadly rounded on the top; postpetiolar node with subparallel anterior and posterior surfaces, not globular
- antennae with distinct 3-jointed club
- median portion of clypeus projecting forwards anteromedially
- eyes obviously elongate, OL:OW not less than 1.50
- propodeal spiracles circular
- propodeum broadly arched in profile, not angular and without denticles, not sculptured dorsally

males:

- antennal scape relatively long, approximately equal to the sum of the first to fourth funicular joints
- body size extremely large (HL > 1.25, AL > 3.5 mm), approximately equal to conspecific females

All references to finds of *M. dentigerum* in Transcaucasus, Turkey and Greece (Emery, 1908, 1921; Forel, 1911; Karawajew, 1926; Zhyzhylashvili, 1964a,b, 1966; Agosti and Collingwood, 1987a,b; Dlussky et al., 1990; Arakelian, 1994) are misidentifications and belong to another species, described here as a new.

As pointed out above, Bolton (1987) excluded *M. evansi* from the *scabriceps* group, but included *M. dentigerum* in it. Examination of a Roger's syntype of *M. dentigerum* showed that Emery's later description (Emery, 1908) of workers of *M. dentigerum* is a misidentifiatim, really referable to another species from *scabriceps* group. His description of females and males from Krasnovodsk (Turkmenistan) belong to species from another species group of the genus *Monomorium*. This easily explains the mistakes of all later authors, who took as a base Emery's incorrect descriptions of *M. dentigerum*. Really *M. dentigerum* is closely related to *M. evansi* and must be placed with it in a separate species group – group *dentigerum*.

Diagnosis of *scabriceps* and *dentigerum* groups based on diagnosis of Bolton (1987) with some additions and specifications is presented in Table 1.

***Monomorium perplexum* Radchenko, sp. n.**

*Monomorium dentigerum*: sensu Emery, 1908: 666; Karawajew, 1926: 109; Agosti and Collingwood, 1987a: 55; 1987b: 272 (part.); Dlussky et al., 1990: 234; Arakelian, 1994: 46; all misidentifications.

*M. glabrum*: sensu Donisthorpe, 1950: 1061 (*Holcomymex*), W. Turkey, misidentification.

Material examined. HOLOTYPE worker: Armenia, env. Megry, vil. Legvaz, No. 324–86, 20.VI.1986 (leg. A. Radchenko) (IZK). PARATYPES: 20 workers from the nest with holotype; 10 workers, the same place, date and collector, No. 328–86; 6 workers, Armenia, Ekhegnadzor, Malyshka, 22. V.1988 (leg. G. Arakelian) (IZK); 2 workers, Georgia, Lekistskhali, 28.IX.1960, No. 439 (leg. T. Zhyzhylashvili); 1 worker and 1 female, the same place, date and collector, No. 436; 2 workers, Georgia, Eldarskaya plane, 8.IV.1962, No. 107, the same collector; 1 worker, Creta, Amari, 4.V.1906 (leg. Biro); 9 workers, Creta, Heracleon, 12.V.1906, the same collector (MZPW); 2 males, Georgia, Lekistskhali, 28.IX.1960, No. 437 (leg. T. Zhyzhylashvili); 5 workers, Georgia, Eldarskaya plane, 8.IV.1962, No.107, the same collector; 2 workers, Transcaucasus, Taribana (ZMMU).

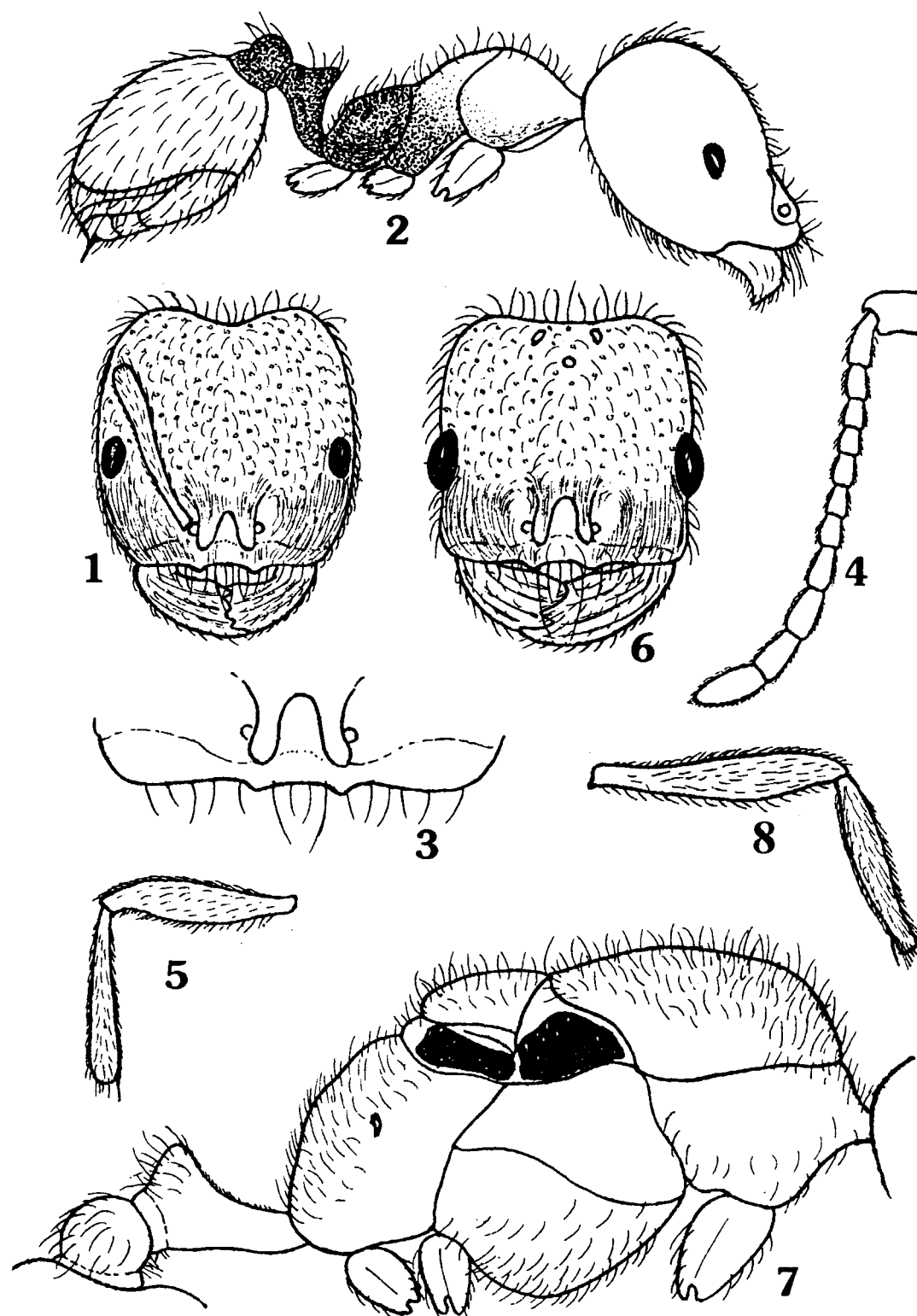
Measurements and indices of holotype: HL=1.27; HW=1.23; SL=0.84; AL=1.33 mm; CI=1.04; SI=1.52; OI=8.27.

**Description**

**Workers** (Figs 1–5). Head somewhat elongate (minor and middle workers), but may be subsquare or sometimes transverse (major workers) (CI=0.99–1.15). Sides of head convex, occipital corners rounded, occipital margin concave; head of minor and middle workers often broadest at the anterior border, in major workers its maximum width is at the level of eyes or in front of eyes. Eyes small (OI=5.88–8.84), especially in major workers, and situated somewhat in front of middle of sides of head. Antennal scape short, not reaching occipital margin of head (SI=1.27–1.60). Antennal club not distinctly 4-jointed, shorter than the remainder of the funiculus; apical joint of antennal club not longer than sum of length of two preapical joints, and joints of club not much wider than previous joints of funiculus. Anterior clypeal margin with shallow, wide concavity and with very short blunt triangular tubercles or without them. Temples and occipital margin of head with numerous long curved hairs, cheeks with more short straight hairs; all surface of head with subdecumbent pilosity, not so dense as in *M. criniceps*. Ventral surface of head with numerous straight hairs. Antennal scape with numerous hairs, outstanding under angle 30–40 degrees.

Head smooth and shining, with sparse fine punctures; only on frons between frontal lobes and on clypeus may be fine longitudinal striae. Mandibles longitudinally rugulose, space between rugae smooth and shining.

Alitrunk slightly convex, promesonotum somewhat flattened; metanotal groove abrupt and deep. Propodeum angular in profile or with short blunt rounded denticles; horizontal part of propodeum slightly flattened from above, its length equal to length of propodeal declivity; declivity of propodeum with shallow longitudinal impression. Petiole with long anterior peduncle, its node low, triangular and rounded on the top. Postpetiole low, globular. Alitrunk, petiole and postpetiole with numerous outstanding hairs of varying length. Gaster with long numerous outstanding hairs and sparse short pubescence. Hind and middle tibiae with subdecumbent pilosity.



Figs 1–8. *Monomorium perplexum* sp. n. (1–5 – holotype worker, 6–8 – paratype female); 1, 6 – head in full-face view; 2 – body in profile; 3 – clypeus; 4 – antennal funiculus; 5, 8 – hind tibiae and femora; 7 – alitrunk and pedicel in profile.

Dorsum of pronotum and mesonotum smooth and shining, other parts of alitrunk and pedicel densely punctured, propodeum also with fine rugosity.

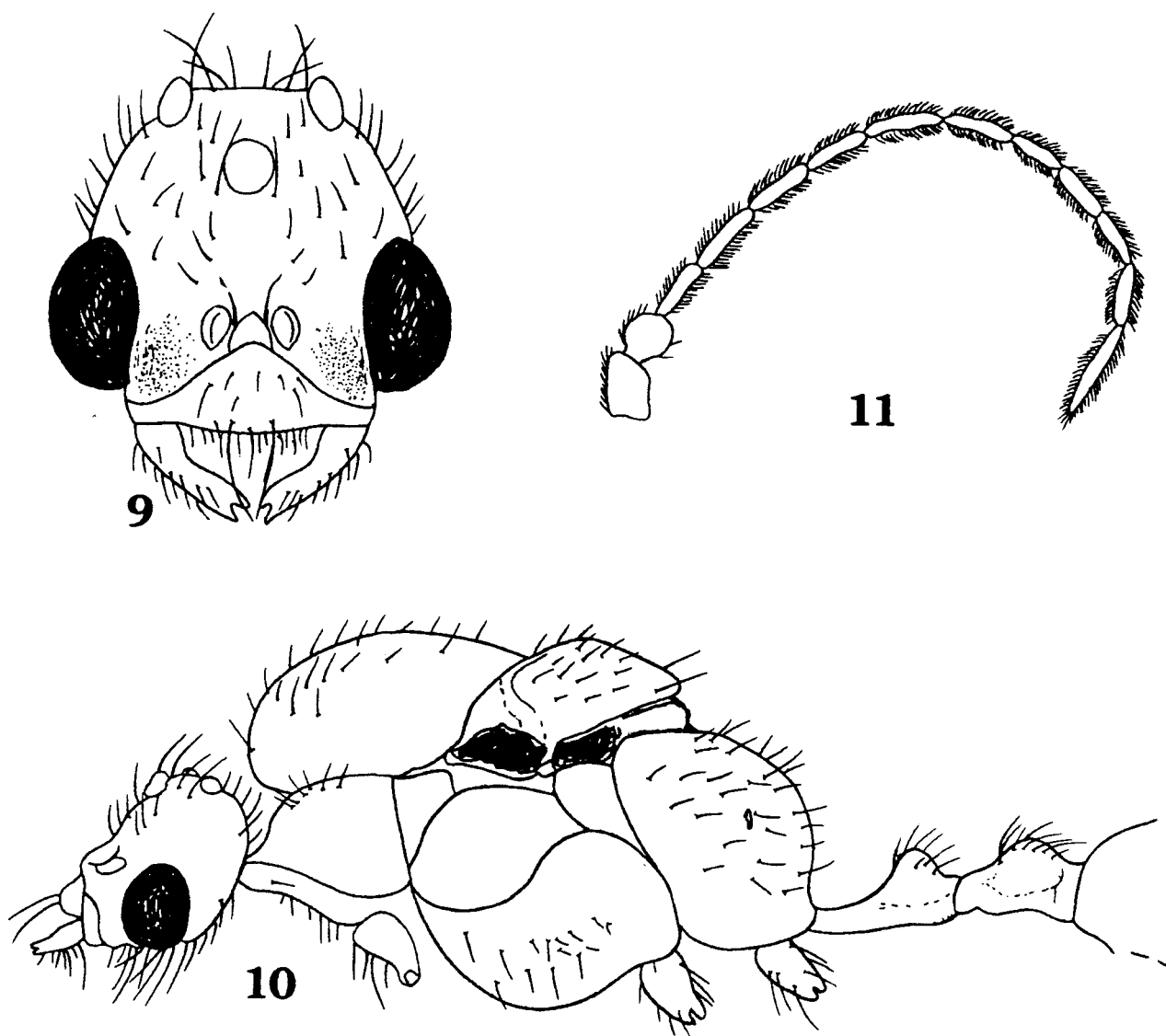
Head, alitrunk and pedicel from orange-red to reddish-brown, gaster from brownish-red to dark brown, legs brownish- or reddish-yellow.

Measurements: HL=0.69–1.37; HW=0.62–1.38; SL=0.52–0.87; AL=0.83–1.37 mm.

**Females** (Figs 6–8). Head rectangular (CI=1.02), with subparallel, very slightly convex sides, narrowly rounded occipital corners and very slightly con-

cave occipital margin. Eyes large (OI=3.75), circular, situated somewhat lower than middle of sides of head. Antennae as in workers (SI=1.34). Anterior clypeal margin with shallow, wide concavity, and with very short blunt triangular denticles. Head with numerous long curved hairs; ventral surface of head with numerous long, partly j-shaped hairs, forming a psammophore. Antennal scapes with numerous subdecumbent pilosity. Sculpture of head as in workers.

Alitrunk relatively long (AI=1.70, Sci 1=1.62), somewhat flattened from above, mesonotum not



Figs 9–11. *Monomorium perplexum* sp. n., paratype male; 9 – head in full-face view; 10 – head, alitrunk and pedicel in profile; 11 – antennae.

hanging over pronotum (see in profile). Scutum longer than broad (SCI 2=1.07). Propodeum broadly rounded, only with indistinct blunt tubercles; its declivity convex, without longitudinal impression.

Petiole with long anterior peduncle, its node low, triangular and rounded on the top. Postpetiole low, subglobular. Alitrunk, petiole and postpetiole with numerous long outstanding hairs.

Gaster with long numerous outstanding hairs and rare short pubescence. Hind and middle tibiae and femora with numerous outstanding hairs.

Alitrunk entirely smooth and shining, only posterior part of propodeum finely striated; pedicel densely punctured, mat.

Body reddish-brown, tibiae, tarsi and antennal scapes reddish-ochraceous.

**Males** (Figs 9–11). Head somewhat elongate (CI=1.06–1.08), narrowed to occipital border. Occipital margin straight. Anterior clypeal margin also straight, without medial impression. Eyes very large (OI=1.96–2.0), convex, oval, situated in front of middle sides of head. Antennae 13-jointed, antennal scape very short (SI=5.22–5.33), shorter than second funicular joint; first funicular joint globular; funiculus thread-form, without distinct club. Mandibles narrow, bidentate.

Head smooth and shining, only with fine shagreenate sculpture between eyes and antennal scrobes. Ventral surface of head and occiput with long curved hairs, frons and sides of head with shorter hairs, antennal joints with numerous short erect hairs.

Alitrunk quite long (AI=1.56–1.57; SCI 1=1.54–1.55). Mesonotum convex, hanging over pronotum (see in profile). Scutum elongate (SCI 2=1.06–1.12), scutellum transverse. Propodeum broadly rounded, not angular, length of its horizontal part equal to declivity.

Petiole with long anterior peduncle, its node low, narrowly rounded on the top. Postpetiole low, subglobular, slightly flattened from above.

Alitrunk, petiole and postpetiole with numerous long outstanding hairs, femora and tibiae with abundant erect or suberect pilosity. Alitrunk and gaster smooth and shining.

Body and femora reddish-brown, antennae, tibiae and tarsi yellowish-ochraceous.

Measurements: HL=0.66–0.67; HW=0.62; SL=0.13; AL=1.96–2.0 mm.

Distribution. Transcaucasus, Turkey, isles of Aegean sea, Greece. Inhabits dry steppe, semideserts, dry open mountain slopes.

Nesting in the ground, often under stones.

#### Notes

Workers of *M. perplexum* differ from other species of *scabriceps* group (except *M. muticum* Emery) by shallow, wide concavity and absence of long acute denticles on the anterior clypeal margin; they differ from *M. muticum* by smooth dorsum and sides of promesonotum; from *M. dentigerum* and *M. evansi* workers differ also by low, triangular petiole that is rounded on the top, and by low, globular postpetiole. Female differs from other species by the same shape of anterior clypeal margin as in workers; from *M. evansi* it well differs by elongate head, low, triangular petiolar node, sparse pilosity on the body etc. Males differ from *M. criniceps* by absence of medial impression on anterior clypeal margin, less sculptured head, presence of long curved hairs on ventral surface of head, elongate scutum etc.; from *M. scabriceps* they differ by absence of rugosity on the head.

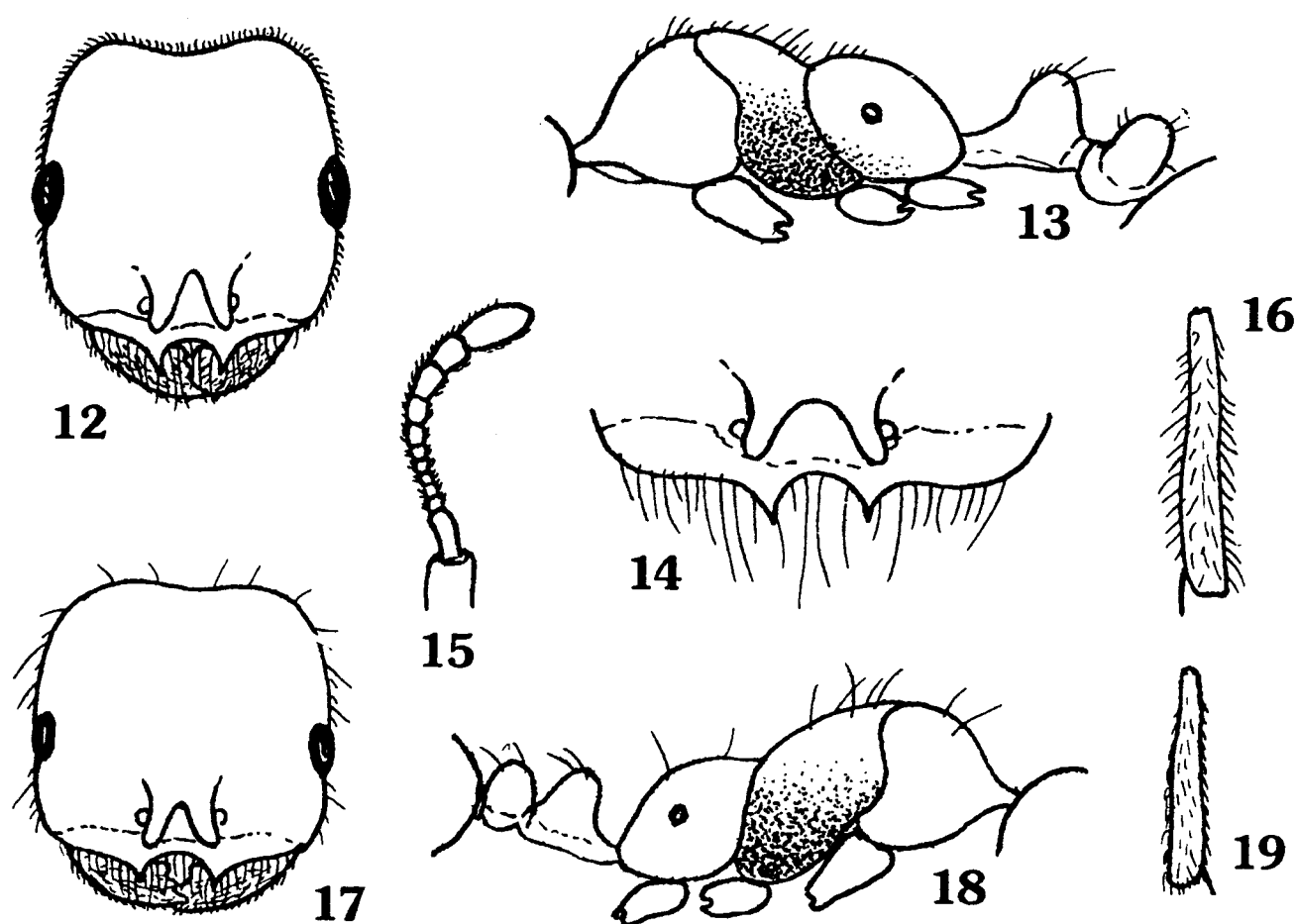
#### *Monomorium dentigerum* (Roger)

*Atta dentigera* Roger, 1862: 259, workers, Syria (Mesopotamia); Roger, 1863: 30 (*Aphaenogaster dentiger*); André, 1883: 346 (*Holcomymex dentiger*); Emery, 1921: 181 (*Monomorium* subgen. *Holcomymex*); Crawley, 1920: 166; Menozzi, 1933: 64; Ettershank, 1966: 88 (*Monomorium*); Bolton, 1987: 321. References by Emery, 1908: 666, workers, females, males; Forel, 1911: 338; Karawajew, 1926: 109; Agosti and Collingwood, 1987a: 55; 1987b: 272; (part.); Dlussky et. al., 1990: 234; Arakelian, 1994: 46 are misidentifications.

*Monomorium dentigerum* var. *baal* Wheeler and Mann, 1916: 171, workers, Palaestina; Syria; Agosti and Collingwood, 1987a: 55; 1987b: 272, syn. n.

Material examined: syntype worker, Mesopotamia (Helper) (labelled as a "TYPUS") (MZPW).

**Redescription of worker** (SYNTYPE) (Figs 12–16). Head somewhat elongate (CI=1.10), extended to anterior border, occipital margin slightly concave. Eyes small (OI=5.98), situated somewhat in front of middle of sides of head. Antennal scape short, not reaching occipital margin of head (SI=1.49). Antennal club distinctly 3-jointed, shorter than remainder of funiculus; joints of club much wider than previous joints of funiculus. Anterior clypeal margin with deep



Figs 12–19. *Monomorium dentigerum* (Roger), syntype worker (12–16) and *M. evansi* Donisthorpe, syntype worker (17–19); 12, 17 – head in full-face view; 13, 18 – alitrunk and pedicel in profile; 14 – clypeus; 15 – antennal funiculus; 16, 19 – hind tibiae and femora.

concavity and with long acute denticles. Temples and occipital margin of head with numerous short straight hairs, without long outstanding hairs. Ventral surface of head with numerous curved hairs, forming primitive psammophore. Antennal scape with short hairs, outstanding under angle 40–45 degrees.

Alitrunk with convex promesonotum and deep and abrupt metanotal groove. Propodeum widely rounded in profile, without distinct horizontal part. Petiolar node high, thick, massive, in profile subrectangular, broadly rounded on the top. Postpetiolar node with subparallel anterior and posterior surfaces, slightly flattened on the top, not globular, its length distinctly less than its width. Alitrunk, petiole and

postpetiole with short numerous hairs and with 1–2 long hairs on each segment.

Gaster with long numerous outstanding hairs and sparse short pubescence. Hind and middle tibiae with numerous outstanding hairs.

Entire body smooth and shining, only lower parts of mesopleuron with distinct dense punctures; head with sparse fine punctures.

Head, alitrunk, pedicel, antennae and legs yellowish-red, gaster reddish-brown.

Measurements: HL=1.07; HW=0.99; SL=0.72; AL=1.28 mm.

Females and males unknown.

Distribution. Middle East.

## Notes

Wheeler and Mann (1916) described from Palaestine and Syria *M. dentigerum* var. *baal*, differing from *M. dentigerum* s. str. only by dark brown color. Agosti and Collingwood (1987 a,b) raised var. *baal* to species level by differences in color between *M. "dentigerum"* from Greece and Turkey (head and alitrunk red, gaster brown) and entirely brown *M. baal*. But as pointed out above, in Greece and Turkey distributes *M. perplexum* sp. n., which has more or less bicolored body, especially in European populations. To my mind, var. *baal* is only a color variation of *M. dentigerum* Roger and must considered as a junior synonym of the latter.

***Monomorium evansi* Donisthorpe**

*Monomorium (Holcomymex) evansi* Donisthorpe, 1918: 166, workers, females, males, Mesopotamia; Emery, 1921: 181; Ettershank, 1966: 89; Bolton, 1987: 321.

Material examined: 2 workers, 1 female and 1 male (syntypes), Amara, Mesopotamia, 1918, coll. Evans; 3 workers, Iraq, Agarguf ad Baghdad, 31.III.1961 (leg. A. Riedel), No. 2863 (MZPW).

Closely related to *M. dentigerum* and differs from it by following features (see Figs 12, 13, 16–19):

1. Alitrunk and pedicel without numerous short hairs, only with long sparse hairs. Occipital margin of the head with long outstanding hairs, short hairs may be present only on cheeks and temples.

2. Hind and middle tibiae with decumbent or subdecumbent hairs.

3. Propodeum more angular, with distinct horizontal part, which not shorter than declivity.

4. Color of head and alitrunk somewhat lighter than in *M. dentigerum* – from yellowish-orange to yellowish-red, gaster reddish-brown.

Measurements: HL=0.99, HW=0.90–0.92, SL=0.67, AL=1.07–1.09 mm.

Distribution. Syria, Iraq.

## Notes

I do not exclude the possibility that *M. evansi* Donisthorpe may be a junior synonym of *M. dentigerum* Roger, but it is necessary to study much more material from different regions of the Middle East and to find females and males of *M. dentigerum*.

***Monomorium criniceps* (Mayr)**

*Holcomymex criniceps* Mayr, 1879: 672, workers, India: Tranquebar; Forel, 1902a: 220; 1902b: 602; Bingham, 1903:

282; Emery, 1921: 181 (*Monomorium* subgen. *Holcomymex*); Chapman and Capco, 1951: 163; Ettershank, 1966: 88 (*Monomorium*); Bolton, 1987: 321.

*Holcomymex criniceps* var. *niger* Forel, 1902a: 220, workers, India; 1902b: 692; Emery, 1921: 181 (*Monomorium* subgen. *Holcomymex criniceps* var. *nigra*); Chapman and Capco, 1951: 163; Ettershank, 1966: 91 (*criniceps* var. *nigrum*), syn. n.

*Holcomymex criniceps* var. *ruber* Forel, 1902b: 692, workers (nota), Ceylon; Emery, 1921: 181 (*Monomorium* subgen. *Holcomymex criniceps* var. *rubra*); Chapman and Capco, 1951: 163; Ettershank, 1966: 92 (*criniceps* var. *rubrum*), syn. n.

## Description of female and male (formerly unknown)

Material examined: female, India, Bombay, No. 4468 (Karawajew's collection, IZK); 1 male with the same label; 1 male, India, Kanara, No. 4447 (Krawajew's collection, IZK).

**Females** (Figs 20–22). Head somewhat transverse (CI=0.90), with slightly convex sides, narrowly rounded occipital corners and slightly concave occipital margin. Eyes large (OI=3.49), round, situated in front of middle of sides of head. Antennae as in workers, scape short, not reaching occipital margin (SI=1.34). Anterior clypeal margin with deep concavity and with long acute denticles. Mandibles with broad masticatory margin and with three denticles on it. Head with numerous long curved subdecumbent hairs; outstanding hairs on ventral surface of head not j-shaped, not forming distinct psammophore. Antennal scape with dense pubescence. Head with numerous long curved subdecumbent hairs and dense large punctures (as in workers).

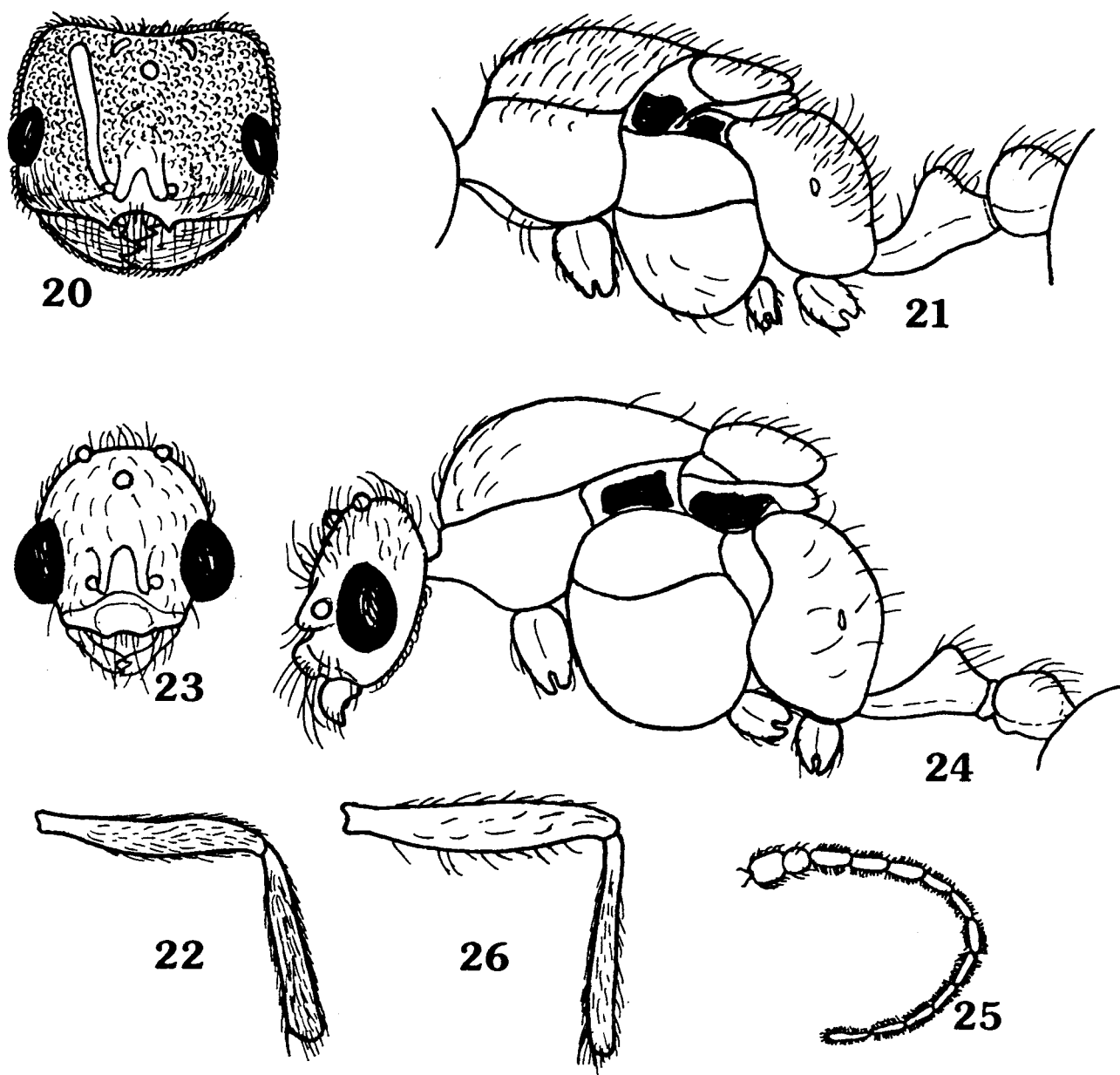
Alitrunk short and high (AI=1.53, ScI 1=1.62), somewhat flattened from above, mesonotum not hanging over pronotum (see in profile). Scutum wider than long (ScI 2=0.96). Propodeum broadly rounded, its declivity flattened, without longitudinal impression.

Petiole node low, triangular and rounded on the top. Postpetiole low, subglobular. Alitrunk, petiole and postpetiole with numerous long outstanding hairs and dense short subdecumbent hairs.

Gaster with numerous outstanding hairs and dense pubescence. Hind and middle tibiae and femora with dense subdecumbent pilosity.

Scutum and scutellum smooth and shining, with only sparse punctures; sides of alitrunk with dense shagreenate sculpture, submat or mat. Pedicel striated and densely shagreenate, mat.





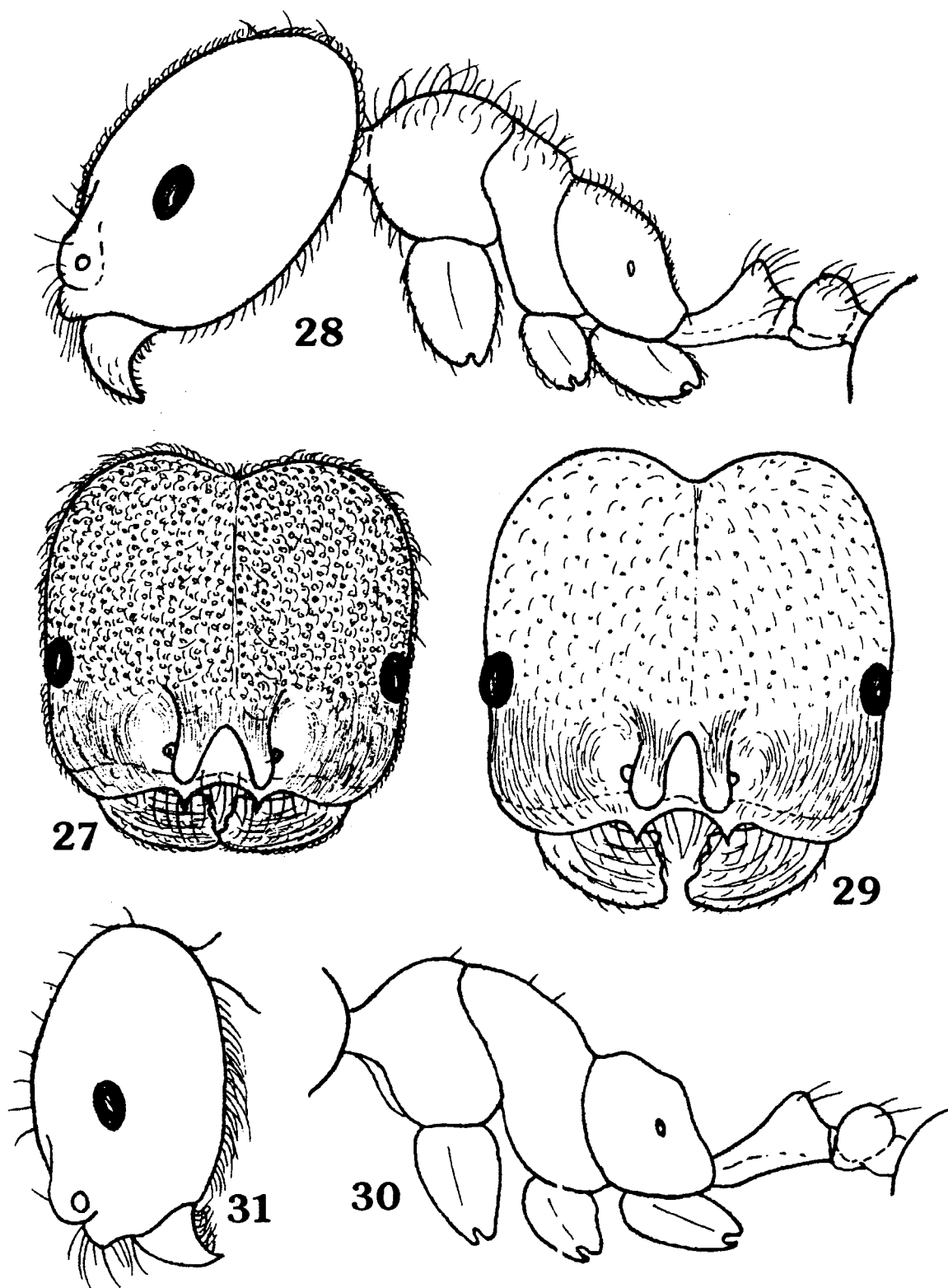
Figs 20–26. *Monomorium criniceps* (Mayr), female (20–22) and male (23–26); 20, 23 – head in full-face view; 21, 24 – alitrunk and pedicel in profile; 22, 26 – hind tibiae and femora; 25 – antennae.

Body brown, only antennae, clypeus, mandibles and tarsi reddish-ochraceous.

Measurements: HL=1.53, HW=1.70, SL=1.10, AL=3.18 mm.

**Males** (Figs 23–26). Head somewhat elongate (CI=1.04–1.07), with broadly rounded temples and

straight occipital margin. Anterior clypeal margin with shallow medial impression. Eyes very large (OI=1.85–1.89), round. Antennae 13-jointed, scape very short (SI=5.33–5.40), shorter than second funicular joint; first funicular joint globular; funiculus thread-form, without distinct club. Mandibles narrow, biden-



Figs 27–31. *Monomorium criniceps* (Mayr), worker (27, 28); *M. glabrum* (André), worker (29, 30); *M. abyssinicum* (Forel), worker (31); 27, 29 – head in full-face view; 28, 30 – alitrunk and pedicel in profile; 31 – head in profile.

tate. Head mainly smooth and shining, but cheeks, temples and posterior part of head densely punctured, submat. Dorsum and sides of head with long curved hairs, ventral surface of head with short curved hairs. Antennal joints with numerous short erect hairs.

Alitrunk short and high (AI=1.45–1.46, ScI 1=1.32–1.49), mesonotum convex, but not hanging over pronotum (see in profile). Scutum transverse (ScI 2=0.88–0.96). Propodeum broadly rounded, its declivity convex, without longitudinal impression.

Petiole with long anterior peduncle, its node low, triangular and rounded on the top. Postpetiole low, subglobular. Alitrunk, petiole and postpetiole with rather sparse long outstanding hairs. Gaster with numerous outstanding hairs and long, but sparse pubescence. Hind and middle tibiae with subdecumbent pilosity, femora with long hairs.

Alitrunk, pedicel and gaster smooth and shining.

Alitrunk, pedicel and gaster reddish-brown, head brown, antennae and legs reddish-ochraceous.

Measurements: HL=0.67–0.77, HW=0.63–0.73, SL=0.13–0.14, AL=1.79–2.18 mm.

Distribution. India, Burma.

#### Notes

Closely related to *M. glabrum* and differs from it by numerous long curved subdecumbent hairs and dense punctures on the head, and by long numerous outstanding hairs on the alitrunk (see Figs 27–28 and 29–30). Var. *niger* Forel, 1902a and var. *ruber* Forel, 1902b are merely color variations of *M. criniceps* and must be considered as junior synonyms of the latter (examined material from India, det. Forel).

Female differs from females of *M. scabriceps* by the absence of dense rugosity on the head; from *M. perplexum* sp. n. – by more dense punctures and numerous subdecumbent hairs on the head, wider and shorter alitrunk, transverse head etc. Males differ from *M. criniceps* by the absence of rugosity on the head; from *M. perplexum* differ by presence of median impression on anterior clypeal margin, more sculptured head, absence of long curved hairs on ventral surface of the head, shorter scutum etc.

#### *Monomorium scabriceps* (Mayr)

*Holcomyrme scabriceps* Mayr, 1878: 672, workers, India: Calcutta; Forel, 1902b: 692; Bingham, 1903: 282, workers, females, males; Emery, 1921: 182 (*Monomorium* subgen. *Holcomyrme*); Chapman and Capco, 1951: 163; Ettershank, 1966: 92 (*Monomorium*); Bolton, 1987: 295, 321.

*Holcomyrme glaber* var. *crinicipitoscabriceps* Forel, 1902a: 220, workers, India: Mysore; Poore; Calcutta; Bingham, 1903: 283; Emery, 1921: 182; Chapman and Capco, 1951: 163; Ettershank, 1966: 88 (*Monomorium*), syn. n.

*Holcomyrme indicus* Rothney, 1889: 367, nomen nudum.

Distribution. India.

#### Notes

Easily differentiated from all other species of *scabriceps* group by its entirely sculptured head. Var. *crinicipitoscabriceps* Forel, 1902a is *M. scabriceps* with somewhat reduced sculpture (examined material from Cochin, India, det. A. Forel).

#### *Monomorium glabrum* (André, 1883)

*Holcomyrme glaber* André, 1883: 345 (footnote), workers, India: Madras; Forel, 1902b: 692; Bingham, 1903: 284; Emery, 1921: 181 (*Monomorium* subgen. *Holcomyrme glabrum*); Chapman and Capco, 1951: 163; Ettershank, 1966: 89 (*Monomorium*); Bolton, 1987: 321.

*Holcomyrme glaber* var. *clarus* Forel, 1902a: 219, workers, India: Poona; Sivalik; Wallon; 1902b: 692; Bingham, 1903: 284; Emery, 1921: 181; Chapman, Capco, 1951: 163; Ettershank, 1966: 88 (*glaber* var. *clarus*), syn. n.

*Holcomyrme glaber* var. *glabrocriniceps* Forel, 1902a: 220, workers, India: Kanara; Bombay; Bingham, 1903: 284; Emery, 1921: 181; Chapman, Capco, 1951: 163; Ettershank, 1966: 89 (*Monomorium*), syn. n.

Distribution. Western and Southern India, Sri Lanka, Burma.

#### Notes

Closely related to *M. criniceps*. Differs from it by sparse short pubescence and sparse punctures on the head, and almost entire absence of outstanding hairs on the body (see Figs 27–30). Var. *glabrocriniceps* Forel, 1902a was characterized by slightly more coarse punctures and more dense pubescence on the head, but outstanding pilosity is typical for *M. glabrum* (examined material: Poona, India, det. A. Forel).

#### *Monomorium muticum* (Emery)

*Holcomyrme muticus* Emery, 1887: 457, workers, Burma; Forel, 1902b: 692; Bingham, 1903: 284; Emery, 1921: 182 (*Monomorium* subgen. *Holcomyrme muticum*); Chapman and Capco, 1951: 163; Ettershank, 1966: 91 (*Monomorium muticum*); Bolton, 1987: 321.

Distribution. Burma.

#### Notes

Differs from other species of *scabriceps* group (except *M. perplexum*) by shallow, wide concavity

and absence of long acute denticles on the anterior clypeal margin. Known only from terra typica. Differences from *M. perplexum* sp.n. are given after description of the latter.

***Monomorium abyssinicum* (Forel)**

*Holcomyrme abyssinicus* Forel, 1894: 83, workers, Ethiopia (Sudabessinen); 1910: 250 (*Monomorium* subgen. *Holcomyrme*); Emery, 1921: 181; Ettershank, 1966: 87 (*Monomorium*); Bolton, 1987: 321 (redescription).

Distribution. Ethiopia, Sudan, Burkina Fasso, Ghana, Nigeria.

**Notes**

Sole afrotropical species from *scabriceps* group. Differs from other species by presence of well developed psammophore.

***Monomorium rogeri* (Mayr)**

*Trichomyrmex rogeri* Mayr, 1865: 19, female, Ceylon; Bingham, 1903: 214; Emery, 1921: 86; Ettershank, 1966: 91 (*Monomorium*); Bolton, 1987: 321.

Distribution. Known only from holotype female, from Sri Lanka.

***Monomorium wroughtonianum* Ettershank, 1966**

*Monomorium wroughtonianum* Ettershank, 1966: 93, replacement name for *Trichomyrmex wroughtoni* Forel, 1911: 453, female, nec *Monomorium wroughtoni* Forel, 1902a.

Distribution. Known only from holotype female, from Sri Lanka.

**Key to *Monomorium* species from *scabriceps* and *dentigerum* groups (workers)**

1. Monomorphic. Petiolar node high, thick, massive, in profile subrectangular, broadly rounded on the top; postpetiolar node with subparallel anterior and posterior surfaces, not globular, its length distinctly less than width. Propodeum broadly arched in profile, not angular and without denticles, not sculptured dorsally. Propodeal spiracles circular. Antennae with distinct 3-jointed club (Figs 13, 15, 18). Median portion of clypeus projecting forwards anteromedially. Eyes obviously elongate, OL:OW not less than 1.50 (*dentigerum* group) . . . . . 2.
- Petiolar node low, triangular and narrowly rounded on the top; postpetiolar node low, globular. Propodeum angular in profile, frequently with blunt rounded denticles, sculptured dorsally. Propodeal spiracles an elongate ellipse or short slit. Antennae with an indistinct 4-jointed club (Fig. 2, 4, 27–30). Median portion of clypeus short, not projecting forwards anteromedially. Eyes slightly elongate or subcircular, OL:OW not more than 1.35 (*scabriceps* group) . . . . . 3.
2. Temples, occipital margin of head and dorsum of alitrunk with numerous short straight hairs; 1 or 2 long outstanding hairs present on each segments of alitrunk. Propodeum widely rounded in profile, without distinct horizontal part (Figs 12, 13) – Middle East . . . . . *M. dentigerum* (Roger).
- Alitrunk and pedicel without numerous short straight hairs, only with sparse long hairs; short hairs present only on cheeks and temples. Propodeum more angular, with distinct horizontal part, which is not shorter than declivity (Figs 17, 18) – Syria, Iraq . . . . . *M. evansi* Donisthorpe.
3. Anterior clypeal margin with shallow, wide concavity and with very short blunt triangular tubercles or without them (Figs 1, 3) . . . . . 4.
- Anterior clypeal margin with deep concavity and with long acute denticles (Figs 27, 29) . . . . . 5.
4. Pro- and mesonotum from above with dense punctures and longitudinal striation, feebly shining. – Burma . . . . . *M. muticum* (Emery).
- Pro- and mesonotum from above with sparse punctures, smooth and shining. – Transcaucasus, Turkey, isles of Aegean sea, Greece . . . . . *M. perplexum* Radchenko, sp. n.
5. Head densely sculptured, with striae and punctures between them. – India . . . . . *M. scabriceps* (Mayr).
- Head smooth and shining, only with sparse or dense punctures (Figs 27, 29). . . . . 6.
6. Ventral surface of head with numerous long, partly j-shaped hairs, forming psammophore (Fig. 31) – Ethiopia, Sudan, Burkina Fasso, Ghana, Nigeria . . . . . *M. abyssinicum* (Forel).
- Outstanding hairs on ventral surface of head (if present) not j-shaped, not forming distinct psammophore (Fig. 28) . . . . . 7.
7. Head with numerous curved subdecumbent hairs and dense large punctures (Fig. 27). Alitrunk with

numerous long outstanding hairs (Fig. 28). – India, Sri Lanka, Burma . . . . . *M. criniceps* (Mayr).

- . Head with sparse short pubescence and sparse small punctures (Fig. 29). Alitrunk without or with only few outstanding hairs (Fig. 30). – India. . . . . *M. glabrum* (André).

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## REFERENCES

- Agosti D., Collingwood C. A. 1987a. A provisional list of the Balkan ants (Hymenoptera, Formicidae) and a key to the worker caste. I. Synonymic list. Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **60**: 51–62.
- Agosti D., Collingwood C. A. 1987b. A provisional list of the Balkan ants (Hymenoptera, Formicidae) and a key to the worker caste. II. Key to the worker caste, including the European species without the Iberian. Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **60**: 261–293.
- André E. 1883. Species des Hyménoptères d'Europe et d'Algérie. 2. Beaune: 345–404.
- Arakelian G. R. 1994. [Fauna of the Armenian Republic. Hymenoptera. Ants (Formicidae)]. Erevan: Gytutun, 153 pp. (in Russian).
- Bingham C. T. 1903. The Fauna of British India, including Ceylon and Burma. Hymenoptera. 2. Ants and Cucko-Wasps. London, 506 pp.
- Bolton B. 1987. A review of the *Solenopsis* genus-group and revision of afrotrropical *Monomorium* Mayr (Hymenoptera, Formicidae). Bulletin of the British Museum (Natural History) (Entomology), **54**: 236–452.
- Chapman J. W. G., Capco S. R. 1951. Check list of the ants of Asia. Monographs of the Institute of Science and Technology, Manila, 1, 327 pp.
- Crawley W. C. 1920. Ants from Mesopotamia and North-West Persia. Entomologist's Record and Journal of Variation, **32**: 161–166.
- Dlussky G. M., Sojunov O. S., Zabelin S. I. 1990. [Ants of Turkmenistan]. Ashkhabad: Ilym, 273 pp. (in Russian).
- Donisthorpe H. 1918. A list of ants from Mesopotamia, with description of a new species and a new variety. Entomologist's Record and Journal of Variation, **30**: 165–168.
- Donisthorpe H. 1950. A first instalment of the ants of Turkey. Annals and Magazine of Natural History, (12) **3**: 1057–1067.
- Emery C. 1887. Catalogo delle formiche esistenti nelle collezioni del Museo Civico di Genova. Patre terzo. Formiche della regione Indo-Malese e dell'Australia. Annali del Museo Civico di Storia Naturale di Genova (2), **5** [25]: 427–473.
- Emery C. 1908. Beiträge zur Monographie der Formiciden des paläarktischen Faunengebietes. V. Monomorium. Deutsche Entomologische Zeitschrift, **1908**: 663–686.
- Emery C. 1921. Genera Insectorum. Hymenoptera, fam. Formicidae, subfam. Myrmicinae. Bruxelles, 397 pp.
- Ettershank G. 1966. A generic revision of the world Myrmicinae related to *Solenopsis* and *Pheidolegeton* (Hymenoptera, Formicidae). Australian Journal of Zoology, **14**: 73–171.
- Forel A. 1894. Abessinische und andere afrikanische Ameisen, gesammelt von Herrn Ingenieur Alfred Ilg, von Herrn Dr. Liengme, von Herrn Pfarrer Missionar P. Berthoud, etc. Mitteilungen der Schweizerischen Entomologischen Gesellschaft, **9**: 64–100.
- Forel A. 1902a. Myrmicinae nouveaux de l'Inde et de Ceylan. Revue Suisse de Zoologie, **10**: 105–249.
- Forel A. 1902b. Les Formicides de l'empire des Indes et de Ceylan. Pt. 10. Journal of the Bombay Natural History Society, **14**: 679–715.
- Forel A. 1910. Formicidae. In: Schultze L. Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika. Preussischen Akademie der Wissenschaften zu Berlin: 1–30.
- Forel A. 1911. Fourmis nouvelles ou interessantes. Bulletin de la Société Vaudoise de Sciences Naturelles, **47**, No. 173: 331–400.
- Karawajew W. A. 1926. Beiträge zur Ameisenfauna des Kaukasus, nebst einigen Bemerkungen über andere paläarktische Formen. Konowia, **5**: 94–199.
- Mayr G. 1865. Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859, unter den Befehlen des Commodore B. von Wüllerstorff-Urbair. Zoologischer Teil. Formicidae. Wien, 119 pp.
- Mayr G. 1879. Beiträge zur Ameisenfauna Asiens. Verhandlungen der k.k. Zoologisch-Botanischen Gesellschaft, Wien, **28**: 645–686.
- Menozi C. 1933. Le Formiche della Palestina. Memorie della Società Entomologica Italiana, **12**: 49–113.
- Roger J. 1862. Beiträge zur Kenntniss der Ameisen-Fauna der Mittelmeerländer. Berliner Entomologische Zeitschrift, **6**: 255–262.
- Roger J. 1863. Verzeichniss der Formiciden-Gattungen und Arten. Berliner Entomologische Zeitschrift, **7**: 1–65.
- Rothney C. A. J. 1889. Notes on Indian ants. Transactions of the Entomological Society of London, 1889: 347–374.
- Wheeler W. M., Mann W. M. 1916. The ants of Phillips expedition to Palestina during 1914. Bulletin of the Museum of Comparative Zoology at Harvard College, **60**: 167–174.
- Zhyzhylashvili T. I. 1964a. [On the study of ant fauna of the steppe zone of Eastern Georgia]. Soobschenia Akademii Nauk Gruzinskoy S.S.R., **33**: 663–666 (in Russian).